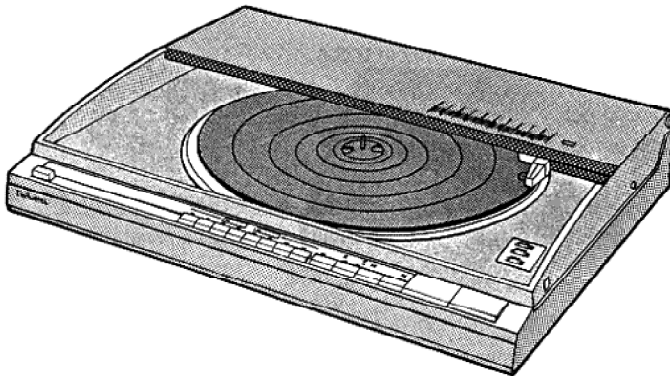


Service Manual

QUARTZ Direct Drive
Fully Automatic Turntable System

Turntable System
SL-L3



Color

(S) . . . Silver Type

Area

[M] U.S.A.

[MC] Canada

T4P is the standard mark for the "P-mount" plug-in-connector system. Products carrying this mark are interchangeable and compatible with each other.

SPECIFICATIONS

■ Turntable section

Type:	Quartz direct drive Automatic turntable system
Features:	Auto start/Auto lead-in, Auto return/Auto stop, Repeat play, Program play, Direct music select play, Forward and backward skip play, Forward and backward search play, Auto size select, Record presence detection
Drive method:	Direct drive
Motor:	Brushless DC motor
Drive control method:	Quartz-phase-locked control
Turntable platter:	Aluminum die-cast Diameter 30 cm (12")
Turntable speeds:	33-1/3 rpm and 45 rpm Auto speed select (Manual selection possible)
Wow and flutter:	0.012% WRMS* 0.025% WRMS (JIS C5521) ±0.035% peak (IEC 98A Weighted)
*Measured by obtaining signal from built-in frequency generator of motor assembly.	
Rumble:	-56 dB (IEC 98A Unweighted) -78 dB (IEC 98A Weighted)

■ Tonearm section

Type:	Linear tracking tonearm 4-pivot gimbal suspension T4P
Effective length:	10.5 cm (4-1/8")
Tracking error angle:	Within ±0.1°
Effective mass:	9 g (including cartridge)
Resonance frequency:	12 Hz
Tonearm drive motor:	DC motor
Applicable cartridge weight:	6 g
Stylus pressure:	1.25 g (Fixed)
Phono cable capacitance:	150 pF

■ General

Power supply:	AC 120 V, 60 Hz
Power consumption:	16 W
Dimensions:	43 × 9 × 35 cm (16-15/16" × 3-17/32" × 13-25/32") (Maximum height when dust cover is open)
	39 cm (15-11/32")
Weight:	5.2 kg (11.5 lb.)

Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

Technics

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and Service Company
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Secaucus, New Jersey 07094

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Carolina, Puerto Rico 00630

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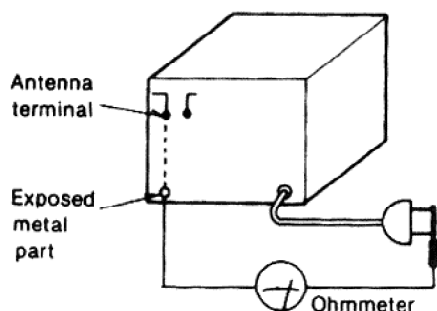
■ SAFETY PRECAUTION (This "safety precaution" is applied only in U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

● INSULATION RESISTANCE TEST

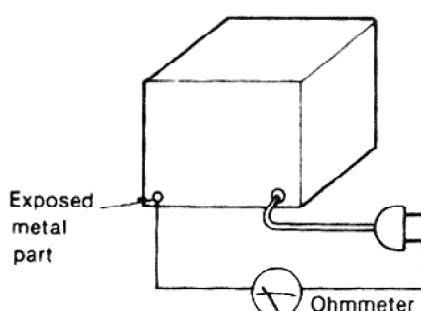
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between $3M\Omega$ and $5.2M\Omega$ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = $3M\Omega$ — $5.2M\Omega$

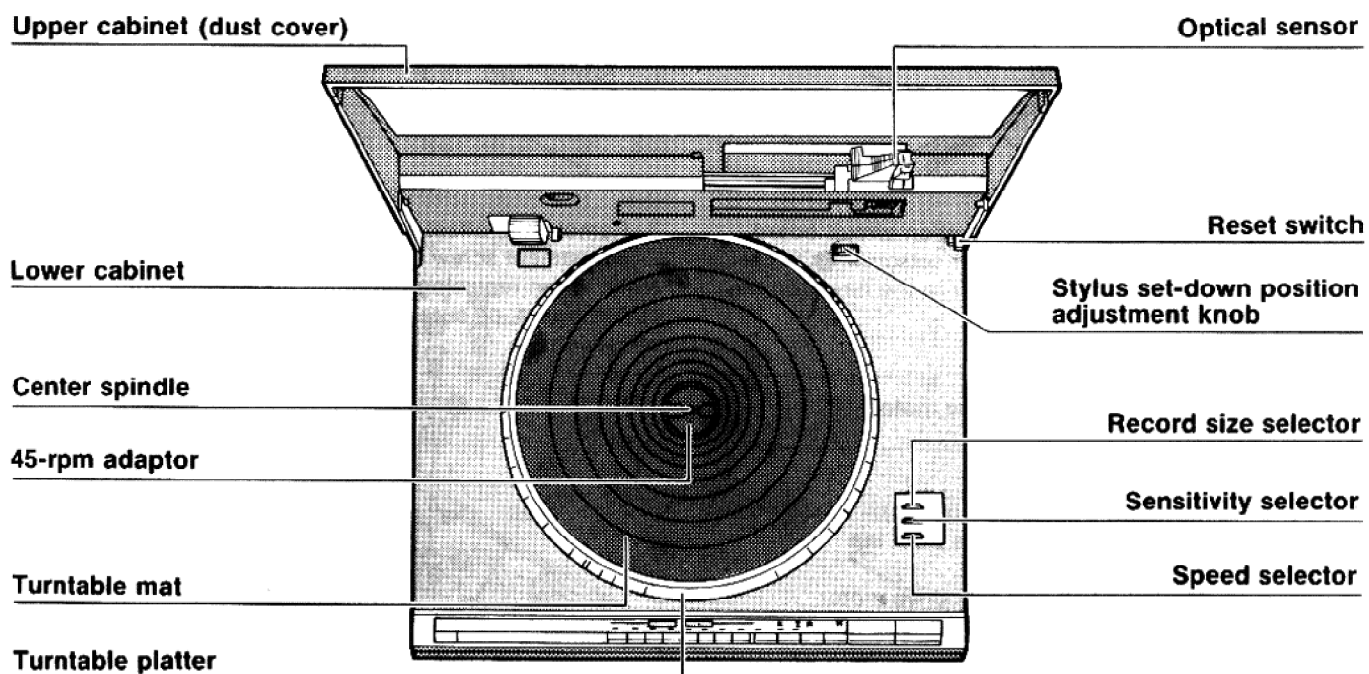
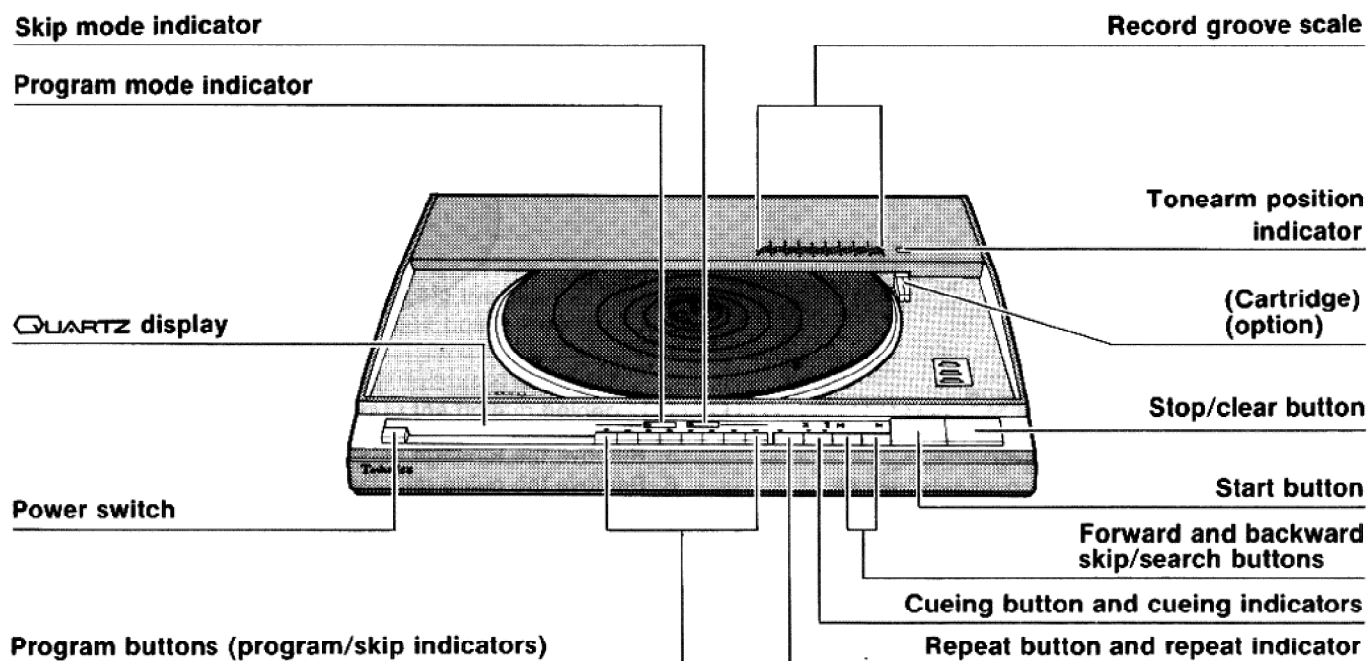


(Fig. B)

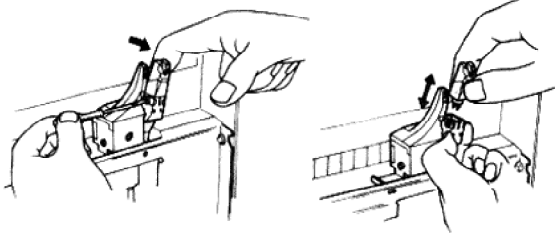
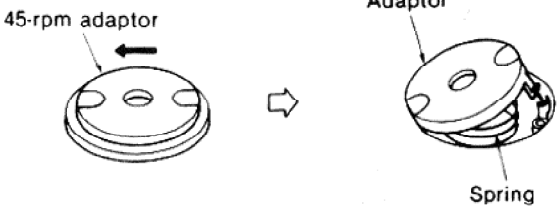
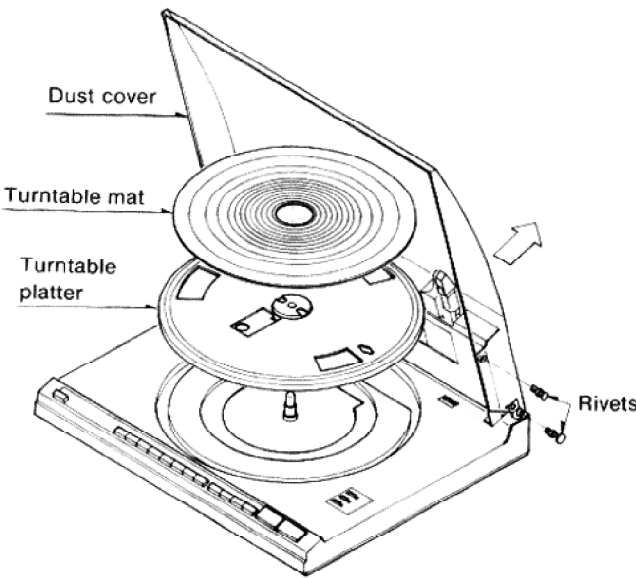
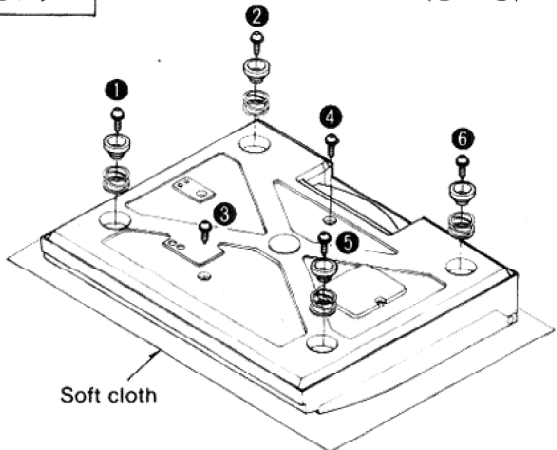
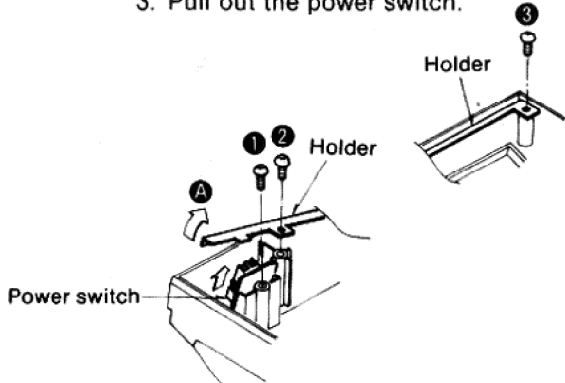
Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ LOCATION OF CONTROLS



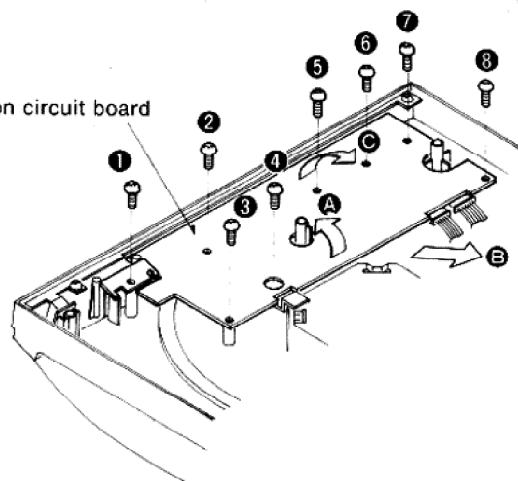
■ DISASSEMBLY INSTRUCTIONS

Ref. No 1	How to remove the cartridge	Ref. No 3	How to remove the 45 rpm adaptor
Procedure 1	1. Open the upper cabinet. 2. Remove the setscrew and pull out the cartridge. Note: When attaching the cartridge again, match the tonearm connector with the cartridge pin, then completely insert it and tighten the setscrew. 	Procedure 2 + 3 • The 2 adaptor claws fit into the turntable platter, so remove the 45 rpm adaptor by pushing it in the direction of the arrow.  Note: When removing the 45 rpm adaptor, remove the turntable platter; otherwise the 45 rpm adaptor claws will be broken.	
Ref. No 2	How to remove the turntable platter	Ref. No 4	How to remove the bottom board
Procedure 2	1. Open the upper cabinet. 2. Remove the turntable mat, and lift the turntable platter. Note: • When removing the turntable platter, it is not necessary to remove the 45 rpm adaptor. • The turntable platter is tightly fitted to the center spindle. When removing the turntable platter, take care not to damage the upper cabinet.  ★ To remove the dust cover 1. Pull out the 4 right and left rivets. 2. Remove the dust cover in the direction of the arrow.	Procedure 2 + 4 1. Turn over the unit on a soft cloth. 2. Remove the 6 setscrews (① ~ ⑥). 	Ref. No 5 Procedure 2 + 4 + 5 1. Remove the 3 setscrews (① ~ ③). 2. Lift the holder slightly in the direction of arrow A. 3. Pull out the power switch. 

Ref. No 6	How to remove the operation circuit board
Procedure 2 ▶ 4 ▶ 6	

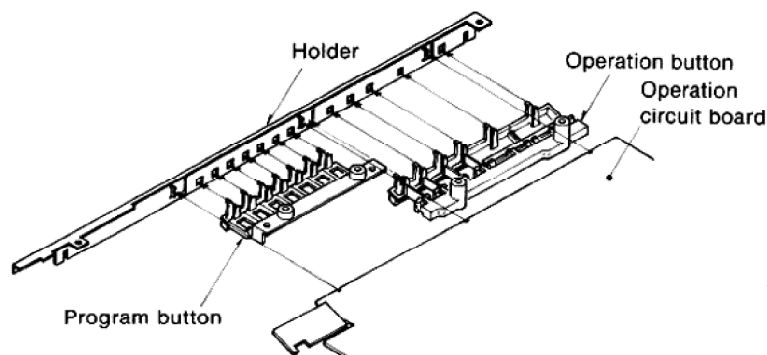
1. Remove the 8 setscrews (① ~ ⑧).
2. Lift the circuit board up in the direction indicated by arrow ⑨.
3. Next, while Pulling in the direction of arrow ⑩, lift it up in the direction of the arrow ⑪.

Operation circuit board



★ **Caution when replacing the board**

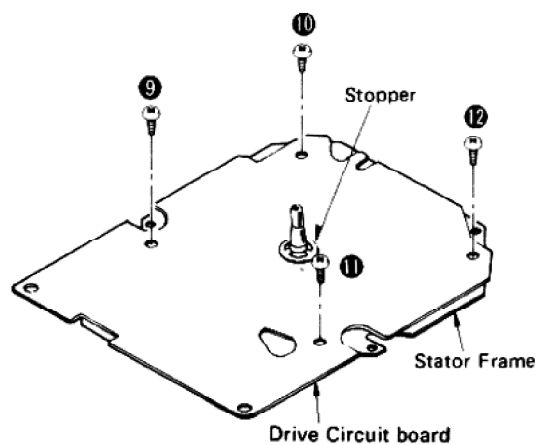
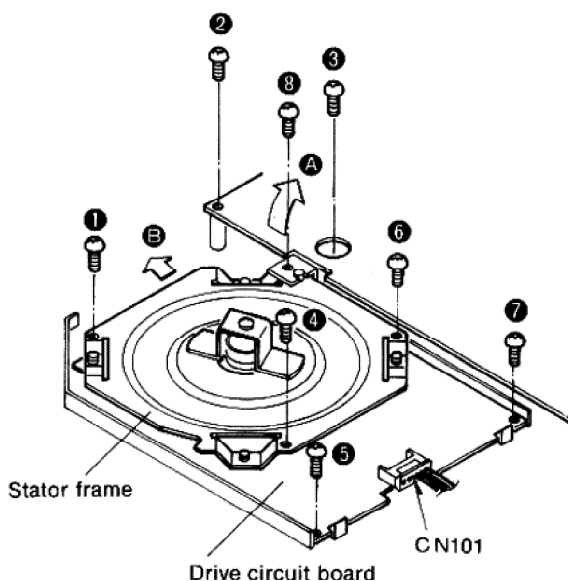
1. The operation circuit board fits into guide rails.
2. Match the operation button and program button to the hole in holder.

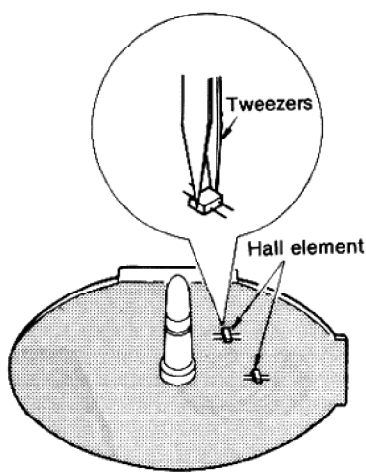


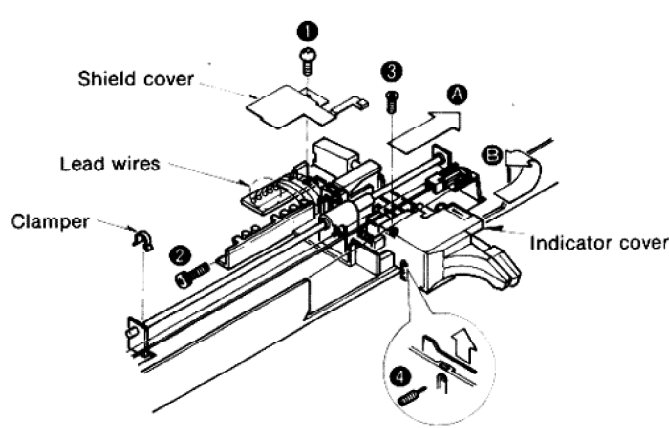
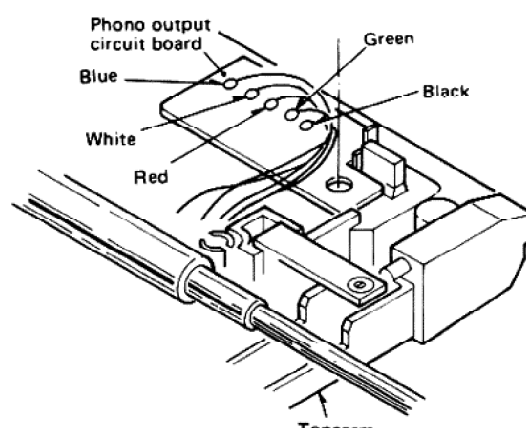
Ref. No 7	How to remove the drive circuit board and stator frame
Procedure 2 ▶ 4 ▶ 7	

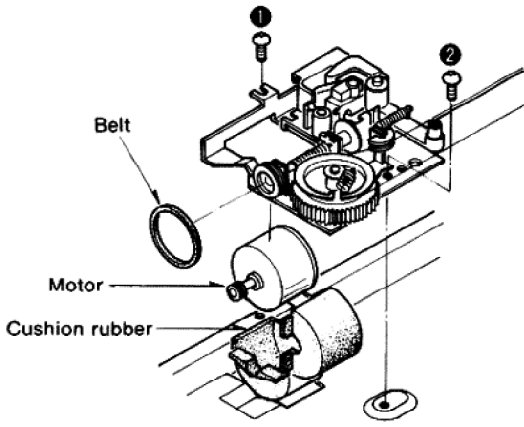
1. Remove the 8 setscrews (① ~ ⑧).
2. Pull out the connector CN101.
3. Lift the operation circuit board slightly in the direction of arrow ⑨.
4. Remove the stator frame in the direction of the arrow ⑩.

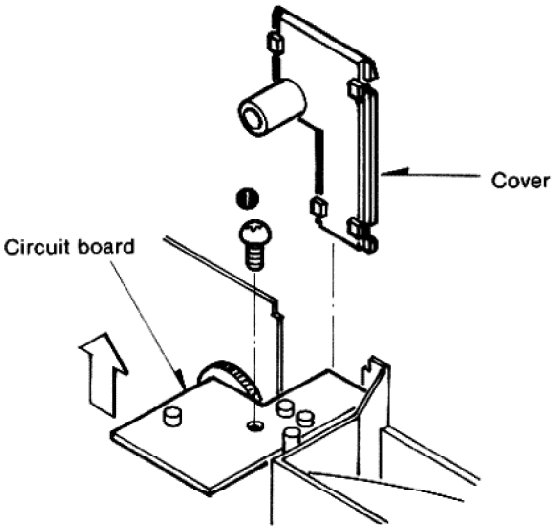
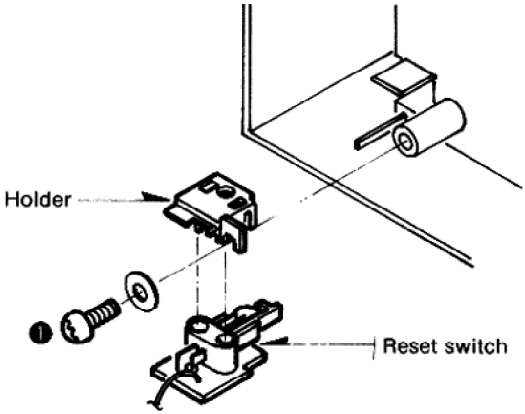
5. Cut off the stopper with nippers.
6. Remove the 4 setscrews (⑪ ~ ⑭).
7. Then, separate the drive circuit board and stator frame.



Ref. No 8	How to remove the Hall element	
Procedure 2 + 8	1. Remove the terminal solder by use of solder sucker. 2. Hold the Hall element with a tweezers and remove it while touching the soldering iron to the terminal. Note: Fit the Hall element with the part No. print up.	

Ref. No 9	How to remove the tonearm	5. Remove the tonearm setscrew ①. 6. Remove the guide rail clamber, and pull out the guide rail. 7. Remove the tonearm in the direction of arrow ②. 
Procedure 2 + 9	1. Remove the dust cover. 2. Remove the shield cover setscrew ①. 3. Unsolder the 5 lead wires. 4. Turn the worm gear with your fingers to move the tonearm inward.  ★ To remove offset angle detection circuit board 1. Remove the indicator cover setscrew ①. 2. Remove the indicator cover in the direction the arrow ②. 3. Remove the offset angle detection circuit board adjustment screw ①. Note: When replacing the offset angle detection circuit board, be sure to adjust the servo gain and offset voltage.	

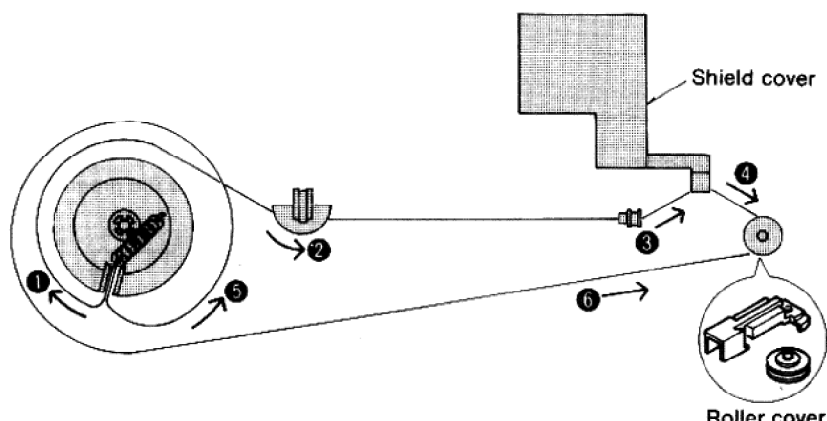
Ref. No 10	How to remove the arm drive motor	
Procedure 2 + 10	1. Remove the dust cover. 2. Remove the 2 setscrews (①, ②). 3. Unsolder the 2 lead wires from the motor. 4. Remove the belt and arm drive motor 5. Open the cushion rubber. Note: Connection of the arm drive motor Red wire (+) terminal of the arm drive motor. Blue wire (-) terminal of the arm drive motor. • An arrow mark is the (-) terminal.	

Ref. No 11	How to remove the stylus set-down position volume circuit board	Ref. No 12	How to remove the reset switch
Procedure 2 ▶ 4 ▶ 11	1. Remove the cover. 2. Remove the stylus set-down position volume circuit board setscrew ①.	Procedure 2 ▶ 4 ▶ 12	1. Remove the screw ①. 2. Remove the 2 claws of the switch holder. 3. Unsolder the 2 switch terminals. Note: When replacing the reset switch, be sure to open the upper cabinet.
			

■ HOW TO SET THE TONEARM DRIVE ROPE

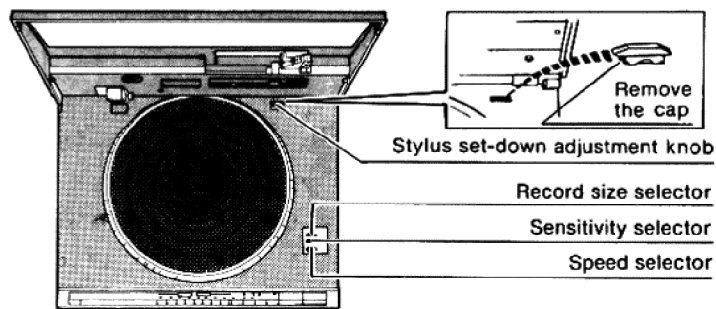
When setting the rope, follow the procedure given below.

1. Remove the dust cover.
2. Remove the roller cover.
3. Set the rope in the order of steps ① ~ ⑥.
4. Fit the rope connector to the tonearm.
5. Set the roller cover and turn the worm gear by hand to see that the tonearm moves.



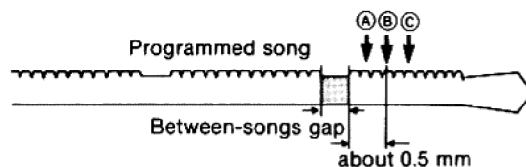
■ PLAYING NON-STANDARD AND SPECIAL RECORDS AND MAKING ADJUSTMENTS

In order to perform program record play, direct song selection, and forward and backward skip functions properly, this unit is designed so that the stylus is lowered shortly before (about 0.5 mm) the beginning of the between-songs gap. Because of this, no sound is heard for about ten seconds after the stylus contacts the record when using one of the above functions.



1. Adjusting the tonearm lowering position

- The stylus set-down adjustment knob is properly set at the factory. However, if it has been jarred loose during shipment, the tonearm may be lowered too far to one side as shown in the diagram to the right. If necessary, correct the problem as described below.



- Ⓐ Tonearm lowered too far to the left.
- Ⓑ Proper location
- Ⓒ Tonearm lowered too far to the right.

Problem	Confirmation/Adjustment
Ⓐ Tonearm lowered too far to the left • No sound is heard even when the stylus reaches the beginning of the specified song.	① Set sensitivity selector to H. ② If beginning of song is cut off during program record play: ③ Rotate knob in the OUT direction (to the right). Note: Always return the sensitivity selector to M after completing the above adjustment.
Ⓒ Tonearm lowered too far to the right • No sound is heard for a long time (more than 30 seconds) after the stylus contacts the record.	① Set sensitivity selector to H. ② If the end of the song before the programmed song is heard: ③ Rotate knob in the IN direction (to the left). Note: Always return the sensitivity selector to M after completing the above adjustment.

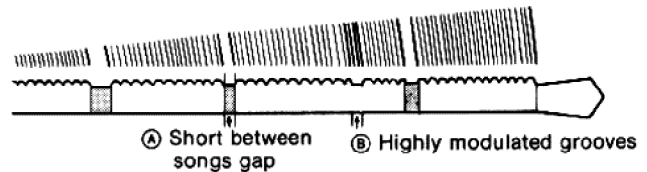
- The tonearm lowering position for the first song of a record cannot be adjusted. Adjustment is possible only for songs 2 through 8.
- If between-songs gaps are extremely short or contain music and when an eccentric record is used, the problem cannot be corrected by this adjustment.

2. Using the sensitivity selector

The between-songs detection function may not operate properly when using the following kinds of records:

- A) Records having extremely short spaces between songs.
- B) Records made at a very high recording level (highly modulated grooves).

In these cases, it may be necessary to change the sensitivity selector.



Problem	Confirmation/Adjustment
Short spaces between songs - Specified song is skipped over and the next song is played instead. - Tonearm lowers at beginning of specified song but no sound is heard.	Set sensitivity selector to H. (If the beginning of the song is still not played correctly, adjust the stylus set-down adjustment knob.)
Highly modulated grooves - Tonearm is lowered at point such as the one shown above. - Song before the specified song is played. (For example, song 4 is heard even though song 5 has been programmed.)	- Set sensitivity selector to L. Notes: - Always return the sensitivity selector to M before playing other records. - With some records, the problem will persist even after making the above adjustment. In this case, program record play, direct song selection and skip functions cannot be used. Play the record using the search function or automatic operation.

3. When playing non-standard records

Record type and problem	Operation and adjustment
- Records having very short between-songs gaps - Severely warped or eccentric records - Colored records - Very dusty and scratched records 30 cm (12") transparent or colored records and sono-sheets (including black records that allow some light to pass through or that have very reflective surfaces)	- Program record play, direct song selection, forward/backward skip and repeat play are not possible. - Set the record size selector to manual and use the search play function. - Set the selector to auto for colored records having a diameter of 17 cm (7") and for standard records.
17 cm (7") diameter 33 rpm records 30 cm (12") diameter 45 rpm records	Set the speed selector to the correct speed for the record to be played. The speed selector should be left in the auto position at all other times.

■ MEASUREMENTS AND ADJUSTMENTS

- **Equipment used and condition of the set**

1. Oscilloscope
2. DC voltmeter
3. Record (SFTR007) for adjustment
4. Set the optical sensor sensitivity selector to "M".

Step	Item	Preparations	Parts adjusted	Procedure
1	Start position	1) Open the upper cabinet and put on the record. 2) Turn the power switch on. 3) Push the "start" switch.	Start position adjust screw. (Fig. 1)	1) Turn the start position adjusting screw. If it descends between tunes, turn the screw counterclockwise.
2	Sensor gain	1) Connect DC voltmeter to IC401 12-pin (+) and ground (-). 2) Put on the record for adjustment with side A up.	VR401 (Fig. 2)	1) Turn the power switch on. 2) Tonearm is on a between songs gap (blank area of the record). 3) Adjust VR401 so that the output voltage is $8.5 \pm 0.3V$.
3	Sensor resolution	1) Connect the oscilloscope to the IC401 9-pin (+) and ground (-). 2) Put on the record for adjustment with side A up.	VR402 (Fig. 2)	1) Turn the power switch on. 2) Keep the F skip switch depressed to move the tonearm. (Output is delivered between the tunes.) 3) Adjust VR402 so that the peak output between tunes is $3V \pm 0.3V$. (Fig. 3)
4	Stylus set-down position	1) Connect lead wire with clip to CN301 6-pin to 2-pin of operation circuit board. (Muting operation stops.) 2) Open the upper cabinet and hold the reset switch with tape. 3) Put on the record for adjustment with side B up. 4) Close the upper cabinet. 5) Connect the unit to the amplifier (Connect the speakers to the speaker terminals.)	VR302 (Fig. 4)	1) Turn the power switch on. 2) Push the program key 2, followed by start switch. 3) After completion of cueing down, push the program key 2 for the purpose of skipping. 4) Make sure the descending at count "13". 5) Adjust VR302 so that the descending position is at count "13". Note: • VR302 can also be adjusted from the back of the set. (Fig. 4 (B))
5	Tonearm offset angle	1) Remove the dust cover. (Refer to "DISASSEMBLY INSTRUCTIONS.") 2) Open the upper cabinet and hold the reset switch with tape. 3) Close the upper cabinet. 4) Put on the record.	Adjusting screw (Fig. 5)	1) Turn the power switch on. 2) Keep the F skip switch depressed to move the tonearm. 3) Turn the adjusting screw so that the arm center matches the V-groove of the lift bar.
6	Servo gain and offset voltage	1) Remove the dust cover. (Refer to "DISASSEMBLY INSTRUCTIONS.") 2) Open the upper cabinet and hold the reset switch with tape. 3) Connect the DC voltmeter to CN301 5-pin (+) 2-pin (-). 4) Remove the sensor cover.	VR501 (Servo gain) (Fig. 6) Screw (Offset voltage) (Fig. 6)	1) Turn the power switch on. 2) Keep the F skip switch depressed to move the tonearm. 3) Open the upper cabinet. 4) Completely shift the tonearm to the left. Then, adjust VR501 so that the voltage is 6.0V (Servo gain). 5) Set the tonearm to the center and make sure that the output voltage is 3.0V. 6) If the voltage is not 3.0V, adjust screw so that the output voltage is 3.0V (Offset voltage).

• Adjustment points

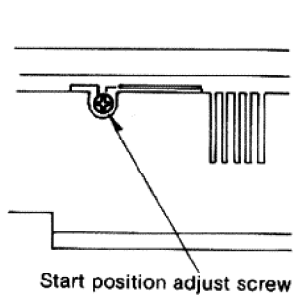


Fig. 1

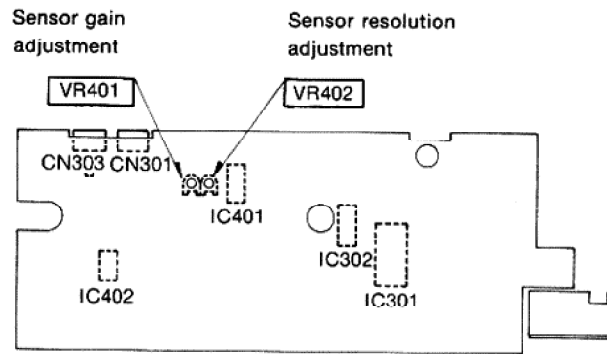


Fig. 2

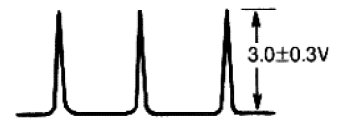


Fig. 3

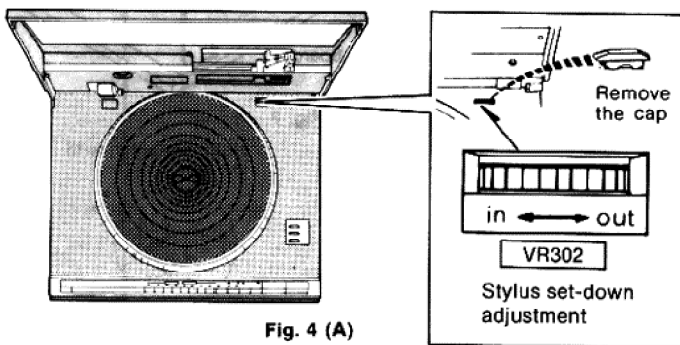


Fig. 4 (A)

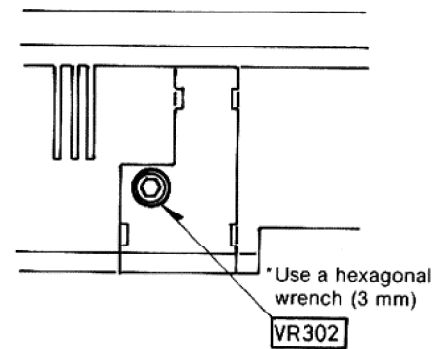


Fig. 4 (B)

Stylus set-down adjustment

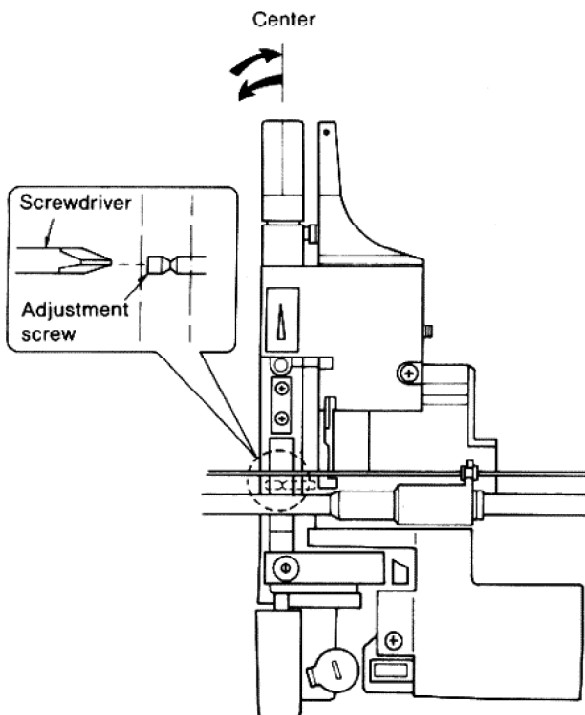
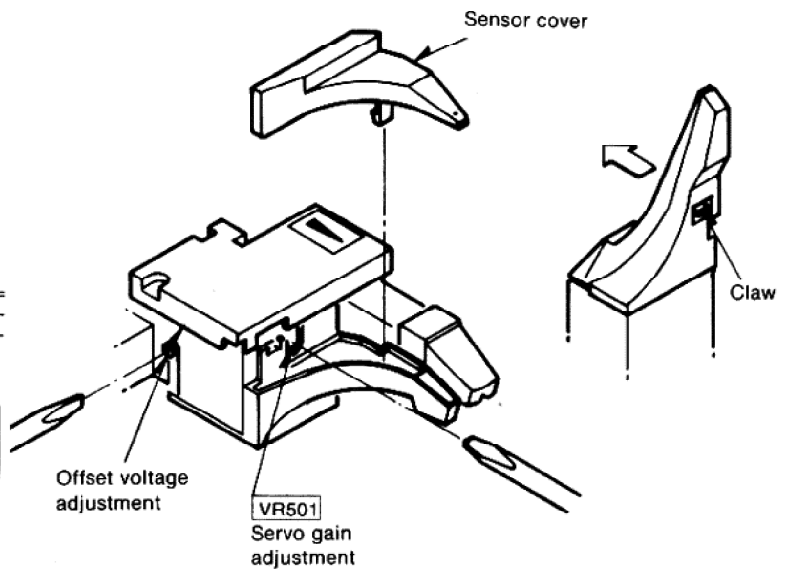


Fig. 5



(Fig. 6)

■ TROUBLESHOOTING

1. How to use the repair table (Fig. 7)

- ① Remove the bottom board.
- ② Remove the operation circuit board and connect the P.C.B. ground terminal to the chassis (Stator frame.)
- ③ Put the unit on the repair table.
- ④ Fit the turntable platter and put on the turntable mat.
- ⑤ Put on the record and check the circuits from under the unit.

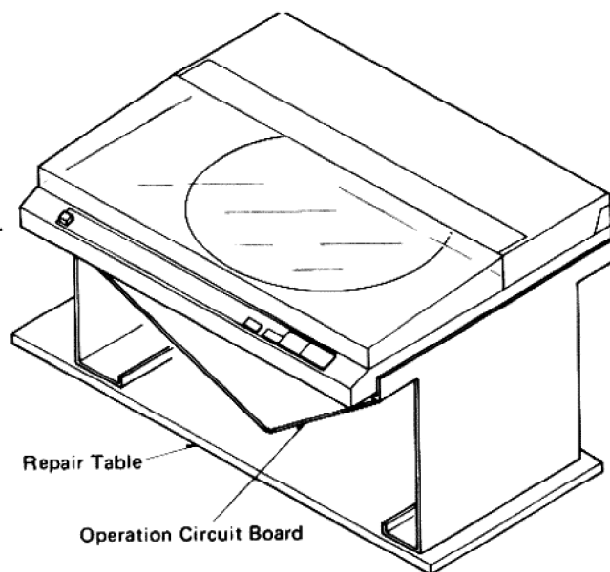


Fig. 7

2. How to raise the set (Fig. 8)

Note: Turntable platter is not fixed on the center spindle. Take care so that the turntable platter will not come loose. Also, take care allow the set to fall down.

- ① Remove the bottom board.
- ② Completely open the upper cabinet.
- ③ Hold the reset switch with the tape.
- ④ Fit the turntable platter.
- ⑤ Raise the unit and check the circuits.

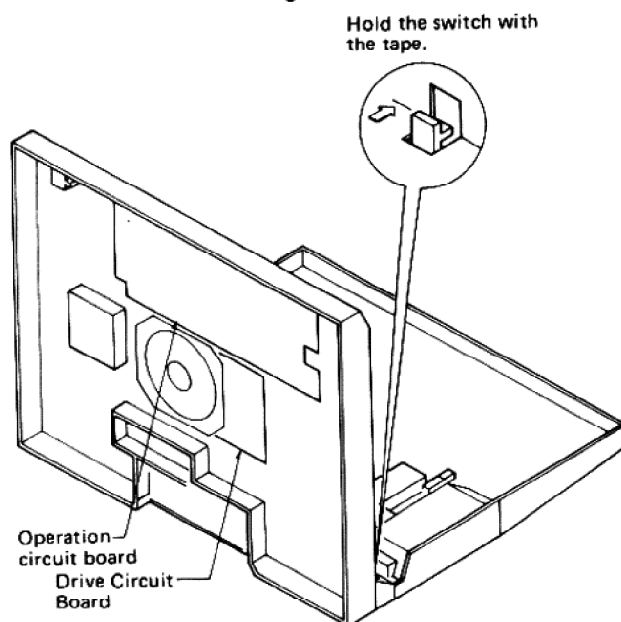


Fig. 8

3. How to turn over the set (Fig. 9)

Note: This purpose is to check the voltage of each circuit during stop of the turntable.

- ① Remove the turntable platter and turn over the unit.
- ② Remove the bottom board.
- ③ Turn the power switch "on" and check the voltage.

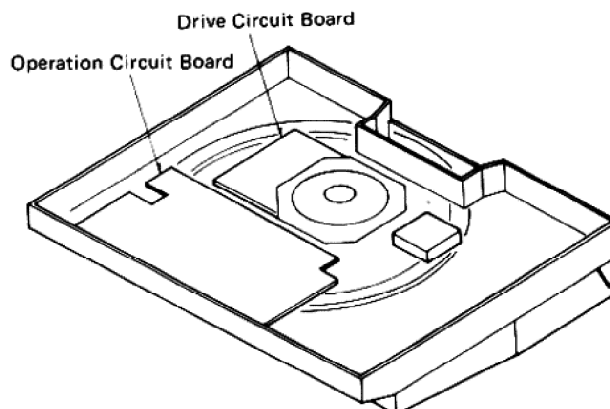
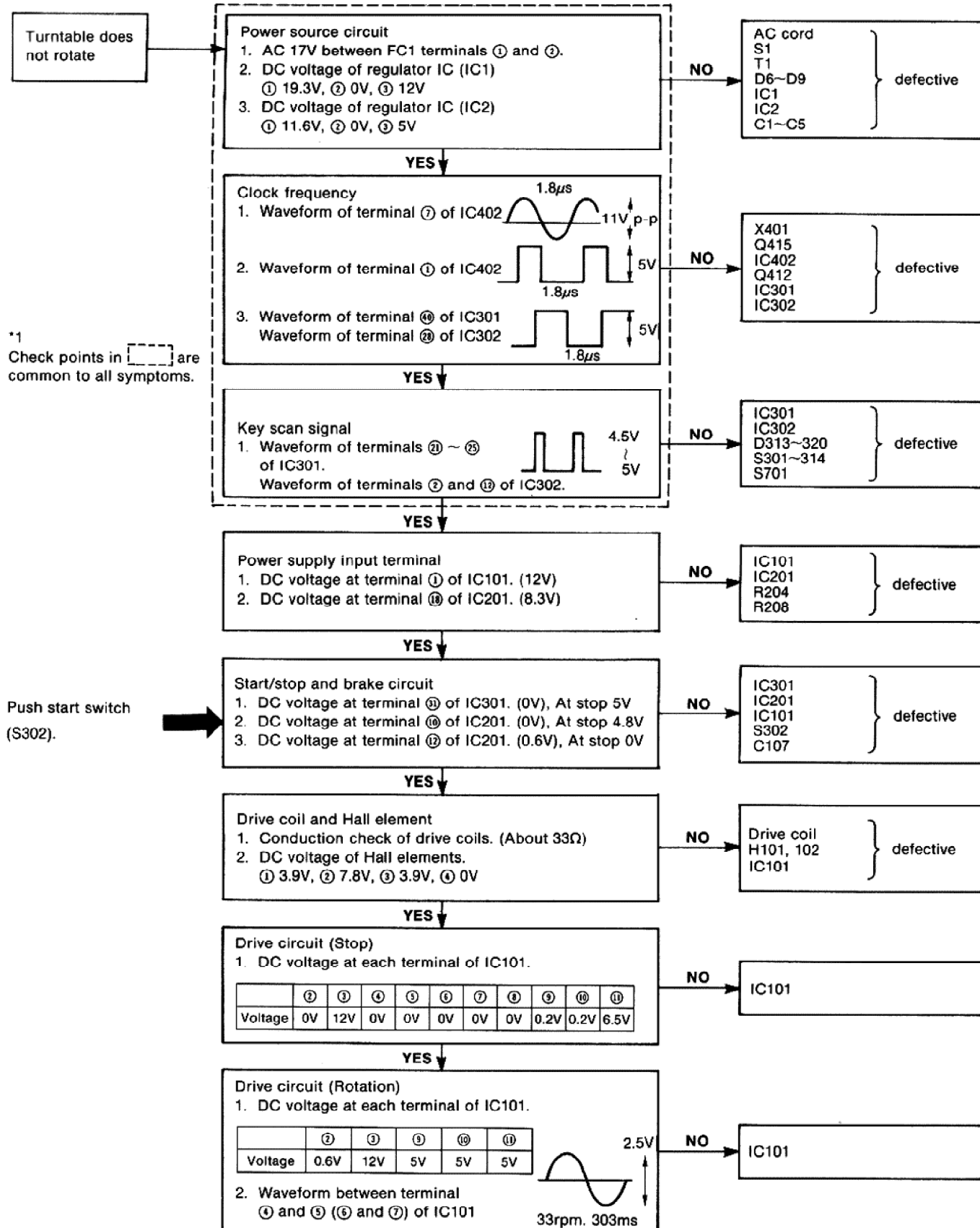
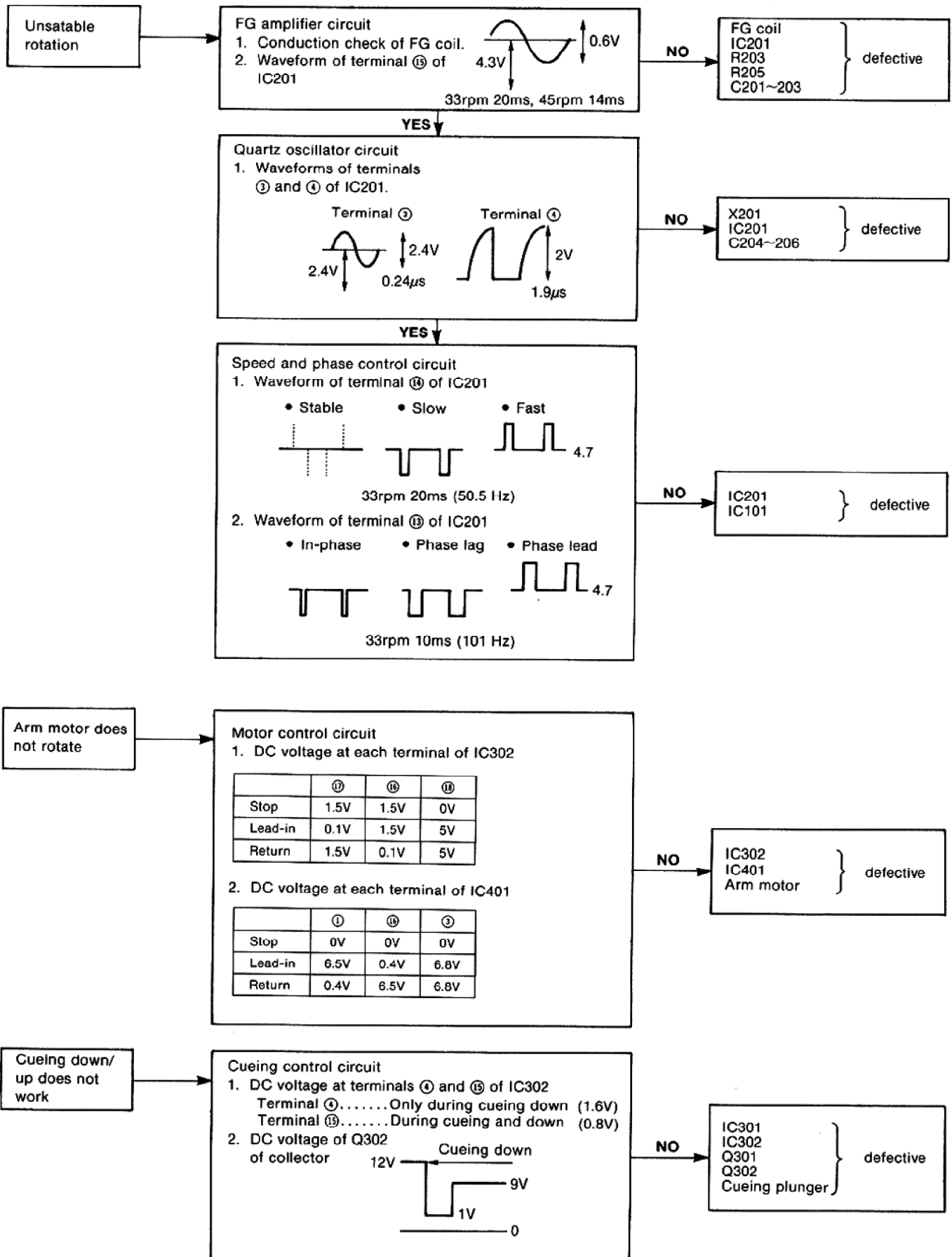


Fig. 9

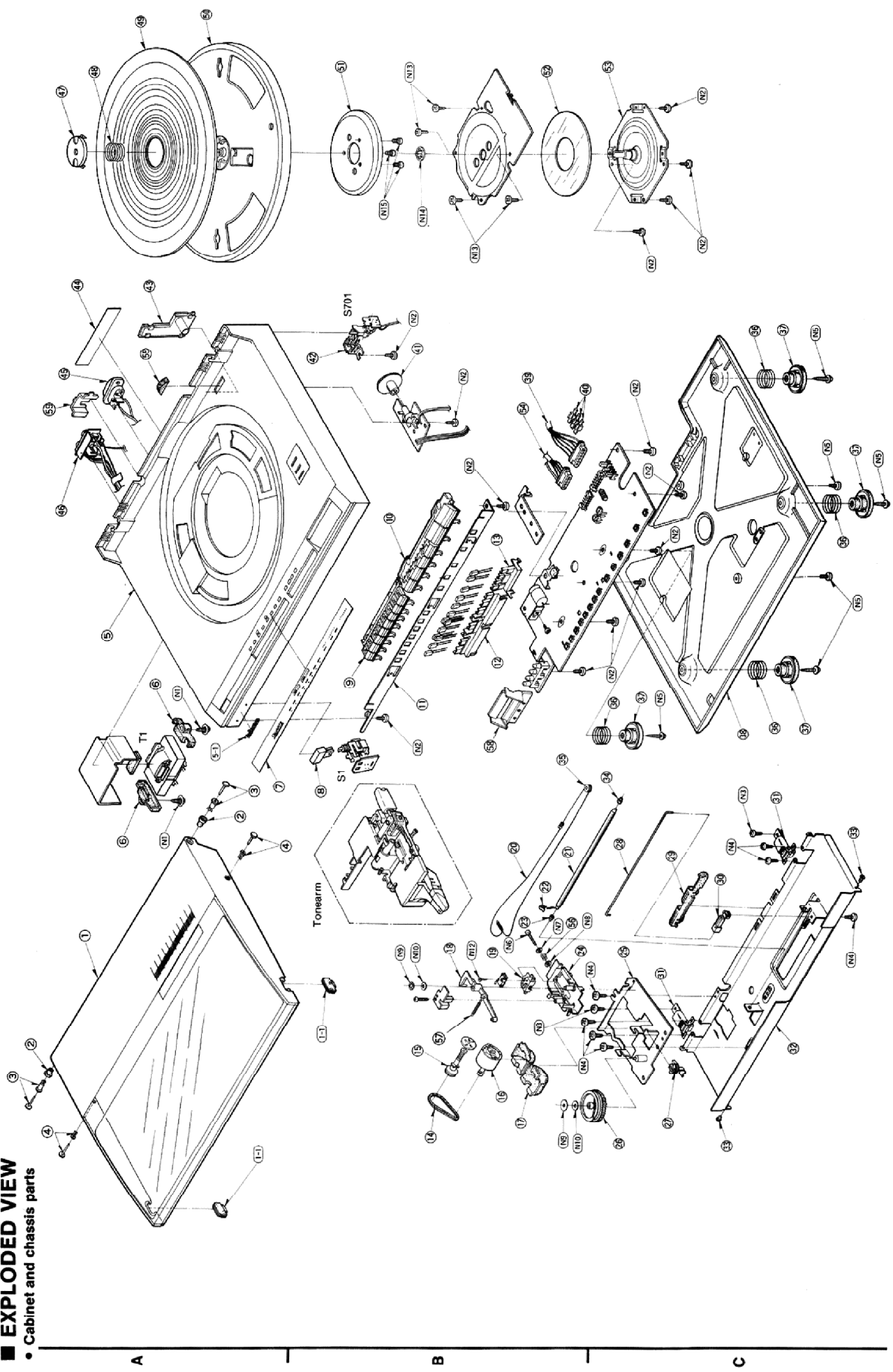


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Check points in [] are
common to all symptoms.



■ EXPLODED VIEW

• Cabinet and chassis parts



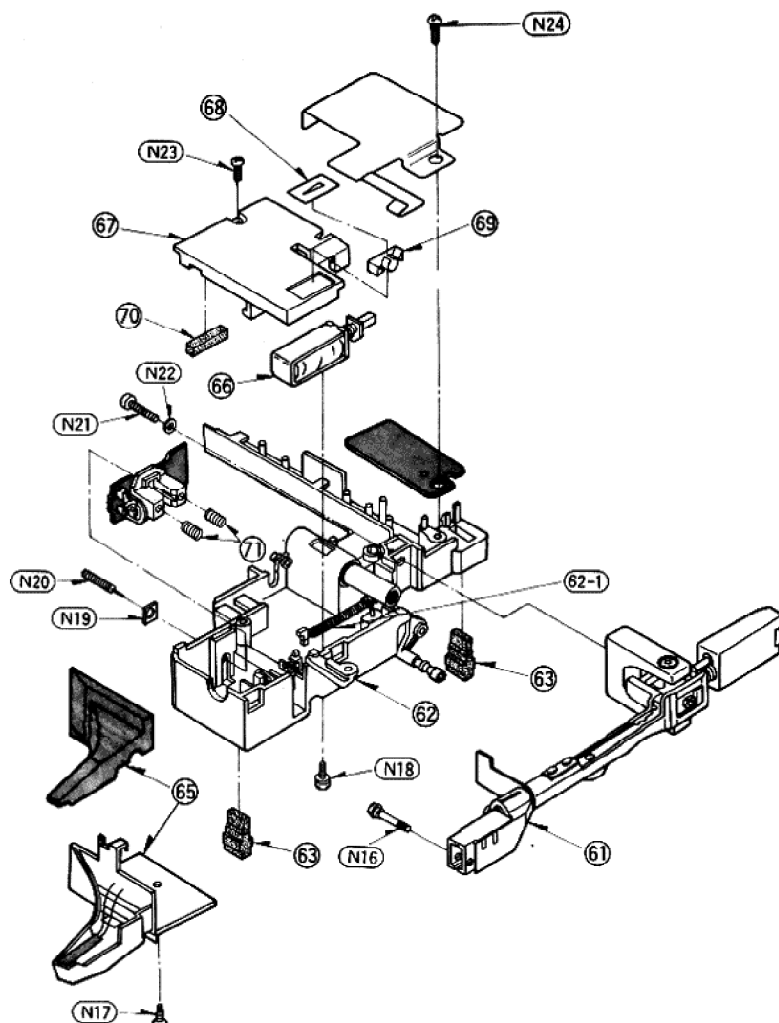
A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
B	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
C	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

• Tonearm parts

A

B

C



A	67 70 68	69
B	66 71	63 62-1
C	65	63 62 61

■ REPLACEMENT PARTS LIST

- Notes:**
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
 2. Important safety notice:
Components identified by a  mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
 3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

4. The "S" mark is service standard parts and may differ from production parts.
5. The parenthesized numbers in the columns of description stand for the quantity per set.

Area

[M]..... U.S.A.
[MC]..... Canada

Ref. No.	Part. No.	Description
INTEGRATED CIRCUITS		
IC1	AN7812	Regulator
IC2	AN78N05	Regulator
IC101	AN6638	Turntable Drive
IC201	AN6683	Turntable Control
IC301	MN1425FPT	Micro Computer
IC302	MN1402FPM	Micro Computer
IC401	AN6690	Arm Motor Drive & Blank Groove Detector
IC402	AN6912	Comparator
IC951	AN6914	Comparator

Ref. No.	Part. No.	Description
TRANSISTORS		
Q301, 304,	2SD636	Switching
364, 402,		
951		
Q302, 303	2SD892	Switching
Q306, 311,	2SB641	Switching
412, 952,		
953		
Q401, 411,	UN1111	Switching
413		
Q415	2SC2206	OSC
Q430	2SD638	Regulator

Ref. No.	Part. No.	Description
DIODES		
D2~5	SVDAY5525S	LED
D6~9	 SVD1SR35200V	Rectifier
D301, 302,	SVDGL-9PG2	LED
343		
D303~311,	SVDGL-9HY82	LED
342		
D312	MA4062	6.2V Zener
D313~319,	MA165	Switching
321~323,		
347, 430,		
431, 951		
952		

Ref. No.	Part. No.	Description
D401	MA4068	6.8V Zener
D402	MA4110	11V Zener
D501, ③	MA162A	Switching
701		
D502	SVDSL3V1VC3	LED
CRYSTAL		
X201	SVQSH41TR	4.1931 MHz
CERAMIC OSC		
X401	SVFCSB540P3	540 kHz
VARIABLE RESISTORS		
VR302	EVJE1AF20B54	Stylus Set-down Position Control, 50 kΩ(B)
VR401	EVN61AA00B55	Sensor Gain Adjustment, 500kΩ(B)
VR402	EVN61AA00B25	Sensor Resolution Adjustment, 200kΩ(B)
VR501	EVNKOAA00B14	Servo Gain Adjustment, 10kΩ(B)
RELAY		
RL701	SFDYQ11N02	Muting
SWITCHES		
S1	△ SFDSC02N02	Power
S301~314	EVQQS405K	Operation
S315, 317	SFDSHSW08314	Speed and Size Selector
S316	SFDSHSW08315	Sens Selector
S601	SFDSC02N03	Rest
S701	SFDSC05N01	Reset
PHOTO INTERRUPTERS		
PC501	0N1186	Offset Angle Sensor
PC502	SFPABJ0205R	Blank Groove Sensor
PC601	0N1161	Tonearm Position Sensor
HALL ELEMENT		
H101, 102	0H-002	Turntable Position Detector
POWER TRANSFORMER		
T1 [M]	△ SLT57DTL2A	Power Source
T1 [MC]	△ SLT57DTS18C	Power Source
FUSE		
F1 [MC]	△ XBA1F10NU14 only	250V, 1A
CABINET AND CHASSIS PARTS		
1	SFADC13M01E	Dust Cover (1)
1-1	SFGZJ02N01	Rubber Cushion (2)
2	SFGZC02N01	Rubber Cushion (2)
3	SFUMC02N14	Latch, Dust Cover (2)
4	SFUMQ06N22	Latch, Dust Cover (2)
5	SFACC13N01E	Cabinet (1)
5-1	SFKBBD2N01	Badge (1)
6	SFGCQ06X01	Rubber Cushion, Transformer (2)
7	SFKKC13N01	Ornament (1)

Ref. No.	Part. No.	Description
8	SRKTK15N26	Knob, Power (1)
9	SFKTC13N02	Knob, Program (1)
10	SFKTC13N01	Knob, Operation (1)
11	SFUPC13N01	Guide (1)
12	SFUMC13N02	Holder (B) (1)
13	SFUMC13N01	Holder (A) (1)
14	SFGBC10-01	Belt (1)
15	SFUMQ06N06A	Worm Ass'y (1)
16	SFMHC02N02R	Motor, (With Capstan) (1)
17	SFUMC02N07	Rubber Cushion (1)
18	SFUMC02N05	Lever, Switch (1)
19	SFUMQ06N09	Holder, Rest Switch (1)
20	SFUZC05N02E	Rope Ass'y (1)
21	SFXJC02N03	Guide, Rail (1)
22	SFUMQ06N07	Clamper, Guide Rail (1)
23	SFGCQ06N01	Rubber, Cushion (1)
24	SFUMC02N06	Base, Rest Switch (1)
25	SFUPBL3N11E	Base, Motor (1)
26	SFUML11R03	Wheel, Tonearm Drive (1)
27	SFUMC02N10	Holder, Lead Wire (1)
28	SFUZC02N01	Rod, Rest Switch (1)
29	SFUMC02N12	Holder, Lead Wire (1)
30	SFUMV05N23	Cap (1)
31	SFATQ06N01E	Hinge (2)
32	SFKUC13N01E	Base, Tonearm (1)
33	SFGZBL3N03	Rubber Cushion (1)
34	SFGCC05N05	Rubber Cushion, Guide Rail (1)
35	SFUMC05N22	Pulley (1)
36	SFQCC05N01	Spring, Insulator (4)
37	SFGAJ02N01	Insulator (4)
38	SFAUC13N01	Bottom Cover (1)
39	SFEHJ02N02E	Phono Output Cord (1)
40	SFKTK06N01	Knob, Selector (3)
41	SFKTK06N02	Knob, Tonearm Down Adjuster (1)
42	SFUMJ02N14	Cover, Rest Switch (1)
43	SFACC13N011	Cover (1)
44 [M]	SFNNC13M01	Name Plate (1)
44 [MC]	SFNNC13C01	Name Plate (1)
45	△ SFDJHSC0491	AC Socket (1)
46	SFDJJ02N04E	Jack, Phono Output (1)
47	SFWEC06N01	45 rpm Adaptor (1)
48	SFQAC06N01	Spring, 45 rpm Adaptor (1)
49	SFTGQ06N01	Turntable Mat (1)
50	SFTEQ05N01	Turntable Platter (1)
51	SFTMC07-01E	Magnet (1)
52	SFMGQ34N01	Cover, Coil (1)
53	SFMZC06N01R	Stator Flame Ass'y (1)
54	SFDJC13N03E	Connector, Ass'y (1)
55	SFGKQ06N01	Cap (1)
56	SFQA913-01	Spring (1)
57	SFQHQ34N22	Spring (1)
58	SFUMC13N03	Prism (1)
59	SFACC13N012	Cover (1)

Ref. No.	Part. No.	Description
TONEARM PARTS		
61	SFPAMJ0201A	Tonearm Ass'y (1)
62	SFPKDJ0201R	Tonearm Base (1)
62-1	SFPSP00504	Spring (1)
63	SFPGML1101	Rubber, Tonearm Guide (2)
65	SFPABJ0205R	Sensor Ass'y (1)
66	SFDZC05N01E	Solenoid Ass'y (1)
67	SFPCS00Q601	Cover, Indicator (1)
68	SFPAK00Q601	Plate, Indicator (1)
69	SFPCSJ0201	Holder, LED (1)
70	SFPGM00Q801	Rubber, LED (1)
71	SFPSP00302	Spring, Adjustor (2)
SCREWS, WASHERS AND NUTS		
N1	SFXGO06N01	Screw (2)
N2	⑤ XTV3+10BFN	Screw, ③×10 (11)
N3	XTW3+14TFZ	Screw, ③×14 (2)
N4	XTV3+6JFZ	Screw, ③×6 (4)
N5	XTW3+14CFYH	Screw, ③×14 (6)
N6	XSN3+30S	Screw, ③×30 (1)
N7	XWE3D10	Washer, φ3 (1)
N8	XNC3HS	Nut (1)
N9	CSTW3	Washer (2)
N10	XWE3A8BW	Washer (1)
N11	XTV3+20J	Screw, ③×20 (1)
N12	XTN16+10G	Screw, ④×16×10 (1)
N13	⑤ XTV3+6BFN	Screw, ③×6 (4)
N14	SFXWC06N02	Washer (1)
N15	⑤ XSN3+5S	Screw (3)
N16	SFPEV0Q601	Screw, Cartridge (1)
N17	XTS26+6JFZ	Screw, ②.6×6 (1)
N18	XYN2+C4FZ	Screw, ②×4 (1)
N19	SFXN623-1	Nut (1)
N20	SFPTN00301	Screw (1)
N21	⑤ XSN3+12S	Screw, ③×12 (1)
N22	⑤ XWA3B	Washer (1)
N23	XTN23+6JFZ	Screw, ②.3×6 (1)
ACCESSORIES		
A1 [M]	SFNUC13M01	Instruction Book (1)
A1 [MC]	SFNUC13C01E	Instruction Book (1)
A2	SFDHC05N01	Phono Output Cord (1)
A3	SFDLJ02N11E	Ground Wire (1)
A4	△ SFDAC05M01	AC Cord (1)
PACKING PARTS		
P1 [M]	SFHPC13M01	Carton Box (1)
P1 [MC]	SFHPC13C01	Carton Box (1)
P2	SFHHC13N01	Pad, Front (1)
P3	SFHHC13N02	Pad, Rear (1)
P4	SFHKC05N01	Clamper, Turntable Platter (2)
P5	SFHKC06N01	Spacer, Tonearm (1)
P6	SFHSC13N01	Spacer, Dust Cover (1)
P7	SFYH60×60	Polyethylene Bag (1)
P8	SFYH17×16	Polyethylene, Cord (1)
P9	SFYF32A35	Polyethylene, Turntable Mat (1)
P10	SFHDD04N01	Pad, Turntable Mat (1)

RESISTORS AND CAPACITORS

- Notes:**
- Part numbers are indicated on most mechanical parts.
Please use this part number for parts orders.
 - Important safety notice:
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
 - This "S" mark is service standard parts and may differ from production parts.

- Unless otherwise specified.
All resistors are in OHMS (Ω) K = 1000 Ω , M = 1000k Ω
All capacitors are in MICROFARADS (μ F), P = 10⁻⁶ μ F.

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value
ERG	1	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Resistor Type	Wattage	Tolerance
ERD : Carbon	S2 : 1/4W	F : $\pm 1\%$
ERG : Metal Oxide	25 : 1/4W	J : $\pm 5\%$
ERX : Metal Film	1 : 1W	G : $\pm 2\%$
	2 : 2W	

ERD2FCG□□□ → Fuse type carbon (1/4W)
ERDS2TJ□□□ → Small type carbon (1/4W)

Capacitor Type	Voltage		Tolerance
	ECEA Type	Others	
ECEA : Electrolytic	1A : 10V	1H : 50V DC	J : $\pm 5\%$
ECKD : Ceramic	1C : 16V	2H : 500V DC	K : $\pm 10\%$
ECQM : Polyester	1E : 25V	1 : 100V	Z : +80%, -20%
ECCD : Ceramic	1V : 35V		P : +100%, -0%
ECKD : Ceramic	1H : 50V		M : $\pm 20\%$
ECEB : Electrolytic	1J : 63V		
ECFR : Ceramic	50 : 50V		
ECFB : Ceramic			

Ref. No.	Part No.	Value
RESISTORS		
R3	ERG2SJ101	100
R4	ERDS2TJ271	270
R103	ERDS2TJ104	100K
R104	ERX1ANJ2R7	2.7
R105	ERDS2TJ270	27
R201	ERDS2TJ273	27K
R202	ERDS2TJ394	390K
R203	ERDS2TJ680	68
R204	ERDS2TJ151	150
R205	ERDS2TJ223	22K
R207	ERDS2TJ102	1K
R208	ERDS2TJ680	68
R301, 302	ERDS2TJ471	470
R303, 304	ERDS2TJ471	470
R305, 306	ERDS2TJ471	470
R307, 308	ERDS2TJ471	470
R309, 310	ERDS2TJ471	470
R311	ERDS2TJ471	470
R312	ERDS2TJ223	22K
R313	ERDS2TJ123	12K
R314	ERDS2TJ332	3.3K
R318, 319	ERDS2TJ333	33K
R321	ERDS2TJ102	1K
R324	ERDS2TJ821	820
R325	ERDS2TJ101	100
R326	ERDS2TJ271	270
R327	ERDS2TJ101	100
H332	ERDS2TJ103	10K
R333	ERDS2TJ101	100
R335, 336	ERDS2TJ332	3.3K
R337, 338	ERDS2TJ332	3.3K
R341, 342	ERDS2TJ332	3.3K
R343, 344	ERDS2TJ103	10K
R346, 347	ERDS2TJ563	56K
R348	ERDS2TJ562	5.6K
R349, 350	ERDS2TJ272	2.7K

Ref. No.	Part No.	Value
R351	ERDS2TJ103	10K
R352	ERDS2TJ101	100
R353	ERDS2TJ222	2.2K
R354	ERDS2TJ333	33K
R355, 356	ERDS2TJ101	100
R381	ERDS2TJ331	330
R383	ERDS2TJ331	330
R385	ERDS2TJ152	1.5K
R386	ERDS2TJ154	150K
R387	ERDS2TJ102	1K
R389, 390	ERDS2TJ223	22K
R393, 394	ERDS2TJ333	33K
R396	ERDS2TJ471	470
R397	ERDS2TJ122	1.2K
R398	ERDS2TJ153	15K
R401	ERDS2TJ103	10K
R402, 403	ERDS2TJ123	12K
R404, 405	ERDS2TJ474	470K
R406	ERDS2TJ104	100K
R407	ERDS2TJ122	1.2K
R408	ERDS2TJ271	270
R409	ERDS2TJ473	47K
R410	ERDS2TJ102	1K
R412	ERDS2TJ222	2.2K
R413	ERDS2TJ821	820
R414	ERDS2TJ561	560
R415	ERDS2TJ271	270
R416	ERDS2TJ153	15K
R417	ERDS2TJ224	220K
R418, 419	ERDS2TJ333	33K
R420	ERDS2TJ103	10K
R421, 422	ERDS2TJ333	33K
R423	ERDS2TJ563	56K
R424	ERDS2TJ224	220K
R425	ERDS2TJ393	39K
R426	ERDS2TJ153	15K
R427	ERDS2TJ224	220K

Ref. No.	Part No.	Value
R428	ERDS2TJ392	3.9K
R430	ERDS2TJ562	5.6K
R431	ERDS2TJ563	56K
R432	ERDS2TJ154	150K
R433	ERDS2TJ471	470
R434, 435	ERG1SJ390	39
R436	ERDS2TJ471	470
R437	ERDS2TJ5R6	5.6
R501	ERD25FJ391	390
R502	ERD25FJ271	270
R503	ERD25FJ471	470
R551	ERDS2TJ823	82K
R552	ERDS2TJ103	10K
R553	ERDS2TJ272	2.7K
R554	ERDS2TJ274	270K
R555	ERDS2TJ472	4.7K
R556	ERDS2TJ563	56K
R557	ERDS2TJ683	68K
RF1	ERD2FCG120	12

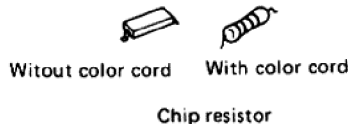
Ref. No.	Part No.	Value
CAPACITORS		
C1, 2	ECQG1223KZ	0.022
C3	ECQG1223KZ	0.022
C4	ECFR1F1J222	2200
C5	ECEA1CU330	33
C6	ECEA0JU470	47
C101	ECEA1CU330	33
C102	ECEA50ZR22	0.22
C103	ECQV05274JZ	0.27
C105, 106	ECEA1AN470S	47
C107	ECEA1HU010	1
C201	ECEA0JU470	47
C202	ECEA50ZR22	0.22
C203	ECQM1H683KV	0.068
C204	ECCD1H121J	120P
C205	ECCD1H330JC	33P
C206	ECCD1H121J	120P
C207	ECEA0JU470	47
C208	ECEA1AU221	220
C302	ECEA1EU4R7	4.7
C305	ECFR1E104ZFM	0.1
C310, 311	ECFR1E104ZFM	0.1
C320	ECFR1E104ZFM	0.1
C401	ECEA1HUR47	0.47
C402	ECEA1CN100	10
C403, 404	ECQG1H473KZ	0.047
C405	ECEA1CU100	10
C411, 412	ECQG1H104KZT	0.1
C413	ECFR1E104ZFM	0.1
C414	ECCD1H181J	180P
C415	ECQG1H682KZ	0.0068
C601	ECFB1B1042M	0.1
C701	ECEA1CU101	100
C951	ECEA1HU010	1
C952	ECEA1CU101	100
C953	ECEA0JU101	100

■ HOW TO REPLACE CHIPS

(Resistor, capacitor and jumper)

● Removing procedure

1. Completely remove the solder from both ends of the chip by use of solder sucker.
2. Touch the soldering iron to the end of the chip as shown in Fig. A, then turn the tweezers in the direction of the arrow.



Do not re-use chip resistor or capacitor without color cord.

● Replacing procedure

1. Place solder on the foil where the chip is fitted. Then solder the chip by holding the soldering iron as shown in Fig. B.

Note:

1. If the chip jumper is removed, connect a coated lead wire to the part. (See Fig. C).
- Chip jumper is marked with "J" on the printed circuit board.

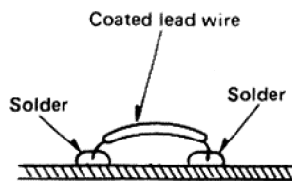


Fig. C

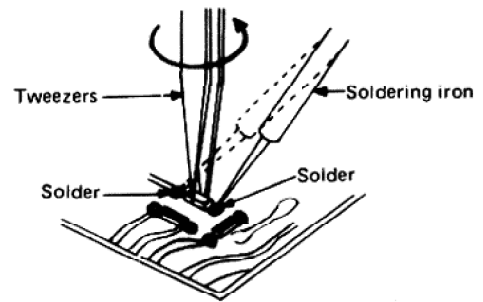


Fig. A

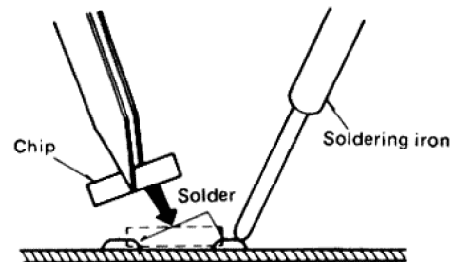
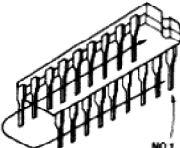
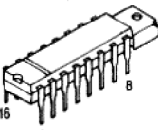
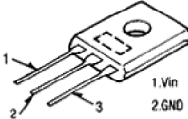
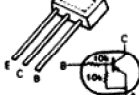


Fig. B

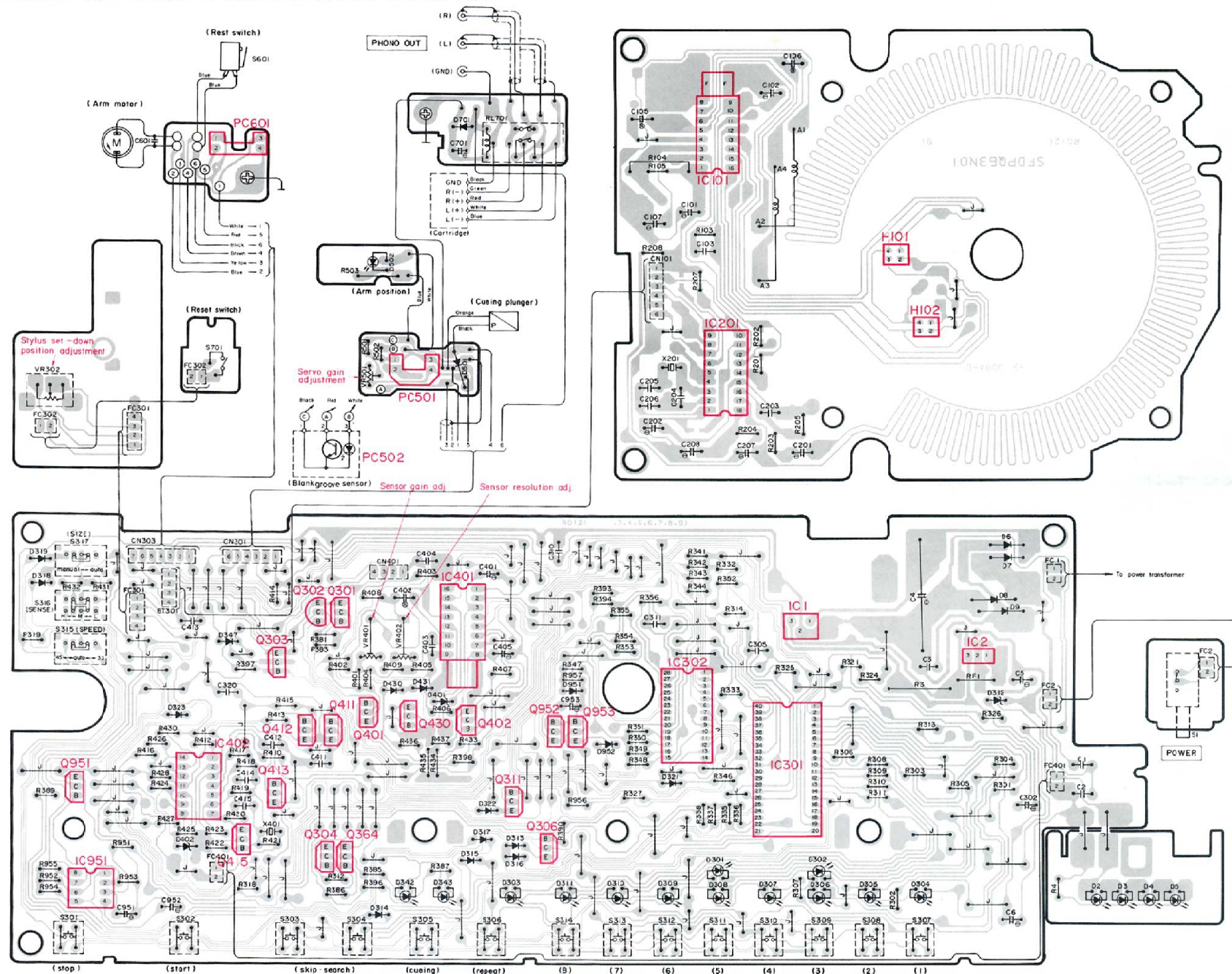
● Note for replacing chips

1. Do not heat the chip more than 3 seconds.
2. Do not rub the electrode against the chip.
3. Use the tweezers with care not to damage the surface of the chip.
4. It is desirable to use a pencil type soldering iron. And use soldering iron less than 60W.

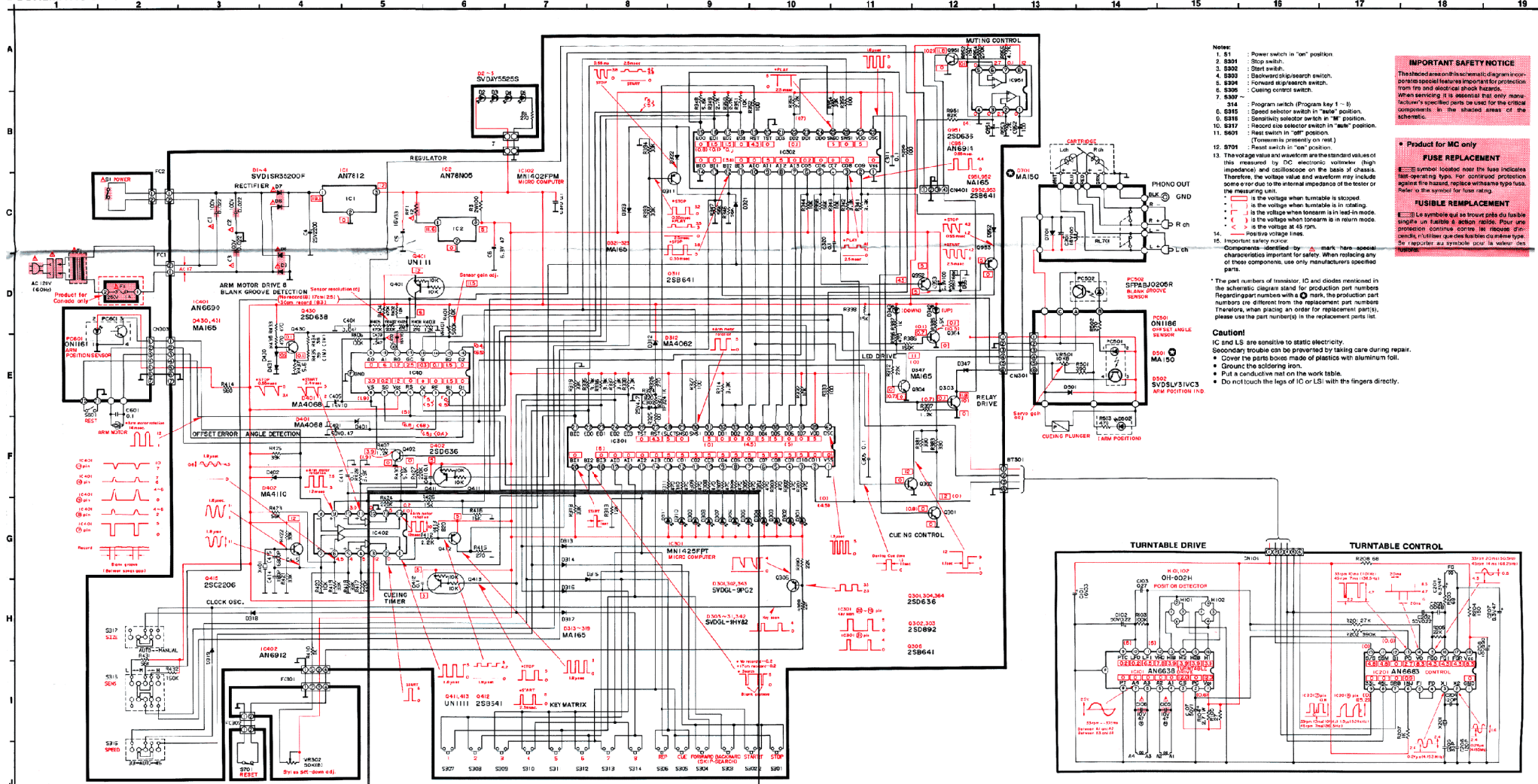
● Terminal guide of transistors, and IC's.

 NO.1	<table border="1"><tr><td>AN6914</td><td>8 pin</td></tr><tr><td>AN6912</td><td>14 pin</td></tr><tr><td>AN6683</td><td>18 pin</td></tr><tr><td>MN1425</td><td>40 pin</td></tr><tr><td>MN1402</td><td>28 pin</td></tr></table>	AN6914	8 pin	AN6912	14 pin	AN6683	18 pin	MN1425	40 pin	MN1402	28 pin	 AN6638, AN6690	 AN78N05 1. Vin 2. GND 3. Vout
AN6914	8 pin												
AN6912	14 pin												
AN6683	18 pin												
MN1425	40 pin												
MN1402	28 pin												
 2SB641, 2SD636, 2SD638, 2SC2206	 2SD892	 AN7812 1. Vin 2. GND 3. Vout	 UN1111										

■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



SCHEMATIC DIAGRAM (This schematic diagram may be modified at any time with development of new technology.)



- Notes:
1. 81 Power switch in "on" position.
 2. 8301 Stop switch.
 3. 8302 Start switch.
 4. 8303 Backward stop/search switch.
 5. 8304 Forward stop/search switch.
 6. 8305 Cueing control switch.
 7. 8307 -
 8. 8314 Program switch (Program key 1 - 5).
 9. 8315 Speed selector switch in "auto" position.
 10. 8316 Sensitivity selector switch in "M" position.
 11. 8317 Record size selector switch in "auto" position.
 12. 8307 -
 13. 8307 -
 14. 8307 -
 15. 8307 -
 16. 8307 -
 17. 8307 -
 18. 8307 -
 19. 8307 -

IMPORTANT SAFETY NOTICE
This schematic diagram is for protection from fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

Product for MC only
FUSE REPLACEMENT
The symbol located near the fuse indicates fast-acting type. For continued protection against the hazard, replace with same type fuse. Refer to the symbol for fuse rating.

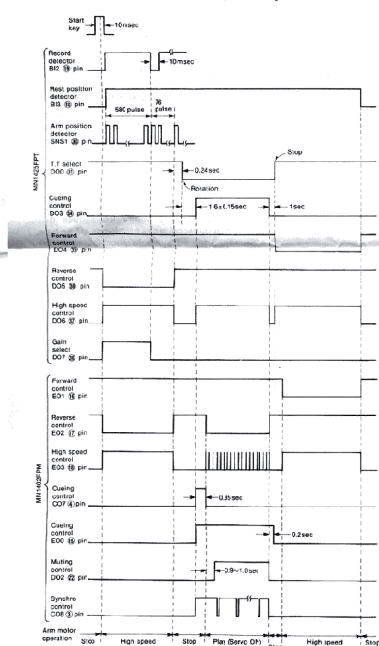
FUSIBLE REMPLACEMENT
Le symbole qui se trouve près du fusible indique un fusible à action rapide. Pour une protection continue contre le risque d'incendie, n'utilisez que des fusibles du même type. Se reporter au symbole pour la valeur des fusibles.

The part numbers of transistor, IC and diodes mentioned in the schematic diagram stand for production part numbers. Regarding part numbers with a mark, the production part numbers are different from the replacement part numbers. Therefore, when placing an order for replacement parts, please use the part number(s) in the replacement parts list.

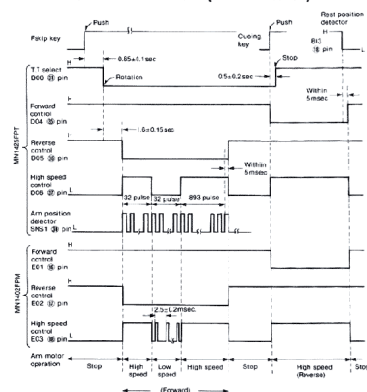
Caution!
IC and LS are sensitive to static electricity. Secondary trouble can be prevented by taking care during repair.
• Cover the parts boxes made of plastics with aluminum foil.
• Ground the soldering iron.
• Put a conductive mat on the work table.
• Do not touch the legs of IC or LS with the fingers directly.

■ BLOCK DIAGRAM

• Time chart of 17 cm record (Lead-in)



• Time chart of 30 cm record (Manual search)

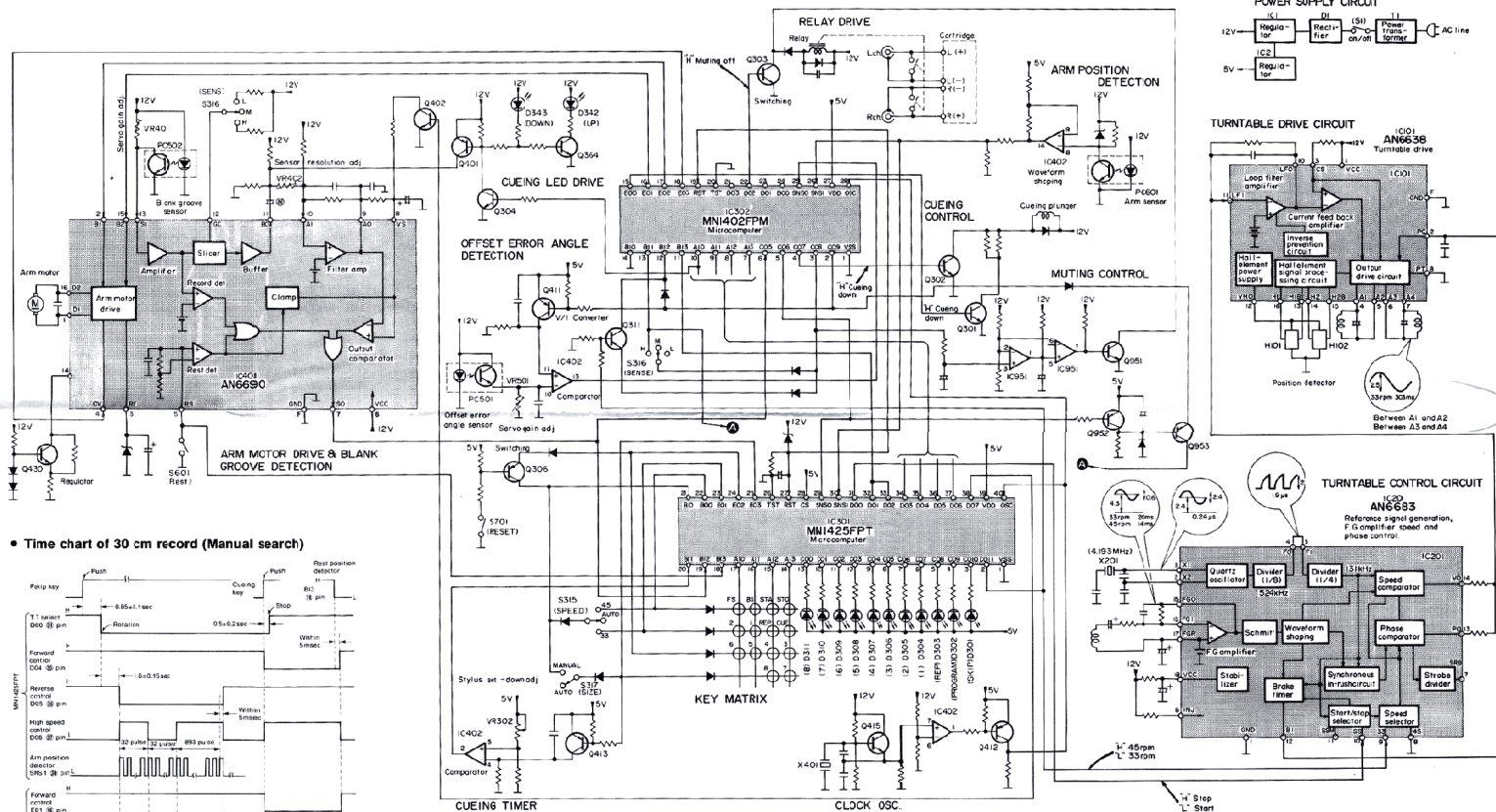


• Function of terminal of MN1425FPT

No.	Symbol	Description
1	VSS	Ground terminal
2	CO11	Turntable speed select (45 rpm "H", 33 rpm "L")
3	CO10	3skip indicator display
4	CO9	Program indicator display
5	CO8	Repeat indicator display
6	CO7	Program No. 1 indicator display
7	CO6	Program No. 2 indicator display
8	CO5	Program No. 3 indicator display
9	CO4	Program No. 4 indicator display
10	CO3	Program No. 5 indicator display
11	CO2	Program No. 6 indicator display
12	CO1	Program No. 7 indicator display
13	CO0	Program No. 8 indicator display
14	A3	Key (F skip, B skip, start, stop, repeat, cueing and program) are read by key scan of E port (pin No. ② ~ ⑥).
15	A2	
16	A1	
17	A0	
18	B3	Rest position detection ("L" when tonearm is on rest)

No.	Symbol	Description
19	B12	- Blank pulse read (during cueing up) and blank width correction pulse count end (during cueing down) signal input terminal. - Blank pulse is active at "L". - Record detection
20	B11	- Blank width correction pulse counting is done until B12 becomes "L" after cueing down. - Reading to stylus lowering adjust timer.
21	B10	Turntable platter speed select, reset switch detection and record size select are performed by key scan (E port pin No. ② ~ ⑥) and B10 key scan.
22	E00	Keys (F skip, B skip, start, stop, repeat, cueing and program) are read by key scan of A port (pin No. ② ~ ⑥), and turntable platter speed select, reset switch detection, and record size selector are performed by key scan of E port and B10.
23	E01	
24	E02	
25	E03	

No.	Symbol	Description
26	TST	Test terminal
27	RST	Reset terminal (Micom is reset at "L")
28	SLCT	Select terminal
29	SNS0	Return detection in play mode (Return at "H")
30	SNS1	Arm position detection signal input terminal
31	DO0	Turntable start, stop select ("H" stop, "L" start)
32	DO1	Speed detection program play mode. (ON at "H")
33	DO2	
34	DO3	Tonearm motor and cueing (muting) control
35	DO4	
36	DO5	
37	DO6	Gain select in record size select mode (ON at "H")
38	DO7	
39	VDD	Power supply
40	OSC	Clock oscillation (Frequency: 525 kHz)



• Function of terminal of MN1402FPL

No.	Symbol	Description																									
1	VSS	Ground terminal																									
2	CO9	Key scan strobe (Offset error angle read strobe)																									
3	CO8	Key scan strobe (Synchro. rec. control, ON at "H")																									
4	CO7	Cueing control																									
5	CO6	Return detection in play mode (return at "H")																									
6	CO5	Pulse count end signal (end at "L")																									
7	AI3	• Tonearm motor and cueing (muting) control • The 4-bit signal from MN1425FPT causes the state to become as follows:																									
8	AI2	<table><tr><td>No.</td><td>7</td><td>8</td><td>9</td><td>10</td></tr><tr><td>Arm free</td><td>L</td><td>L</td><td>L</td><td>L</td></tr><tr><td>Forward search</td><td>L</td><td>L</td><td>H</td><td>L</td></tr><tr><td>Backward search</td><td>L</td><td>H</td><td>L</td><td>L</td></tr><tr><td>Brake (stop)</td><td>L</td><td>H</td><td>H</td><td>L</td></tr></table>	No.	7	8	9	10	Arm free	L	L	L	L	Forward search	L	L	H	L	Backward search	L	H	L	L	Brake (stop)	L	H	H	L
No.	7	8	9	10																							
Arm free	L	L	L	L																							
Forward search	L	L	H	L																							
Backward search	L	H	L	L																							
Brake (stop)	L	H	H	L																							
9	AI1	<table><tr><td>No.</td><td>7</td><td>8</td><td>9</td><td>10</td></tr><tr><td>Lead-in</td><td>H</td><td>L</td><td>H</td><td>L</td></tr><tr><td>Return</td><td>H</td><td>H</td><td>L</td><td>L</td></tr></table>	No.	7	8	9	10	Lead-in	H	L	H	L	Return	H	H	L	L										
No.	7	8	9	10																							
Lead-in	H	L	H	L																							
Return	H	H	L	L																							
10	AI0																										
11	BI3	Speed (blank) detection during program play (ON at "H")																									
12	BI2	} Key scan Sensitivity and speed selector keys are read by key scan of CO8, CO9, BI1, BI2.																									
13	BI1																										
14	BI0	Not used in this unit (Ground)																									
15	EO0	Cueing control																									
16	EO1	Arm motor control																									
17	EO2	<table><tr><td>No.</td><td>16</td><td>17</td><td>18</td></tr><tr><td>Arm free</td><td>L</td><td>L</td><td>L</td></tr><tr><td>Brake</td><td>H</td><td>H</td><td>L</td></tr><tr><td>Forward slow</td><td>H</td><td>L</td><td>L</td></tr></table>	No.	16	17	18	Arm free	L	L	L	Brake	H	H	L	Forward slow	H	L	L									
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21	DO3	Not used in this unit																									
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23	DO1	} Not used in this unit																									
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